

Fenestra

HOLORIB

STEEL ROOF DECKS

Detroit Steel Products Company

2250 E. Grand Boulevard

Detroit, Michigan

HOLORIB INSULATED ROOF DECK

Applied Under Governing Specifications with Insulation and Waterproofing

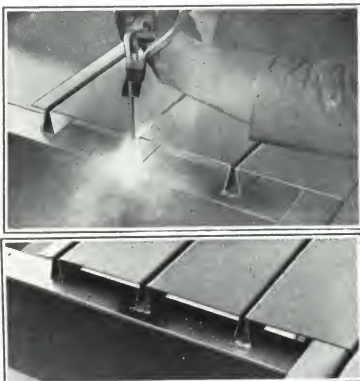
Manufactured by
DETROIT STEEL PRODUCTS COMPANY
 HOLORIB INSULATED ROOF DECK DIVISION

2250 EAST GRAND BLVD.
 DETROIT, MICH.

BALTIMORE, MD., 1017 Fidelity Bldg.
 BIRMINGHAM, ALA., 2431 Avenue "A" So.
 BOSTON, MASS., 38 Chauncy Street
 BUFFALO, N. Y., 818 Stock Exchange Bldg.
 CHICAGO, ILL., 1017-19 Conway Bldg.
 CINCINNATI, O., 703 Fountain Square Bldg.
 CLEVELAND, O., 1740 E. 12th Street
 DALLAS, TEX., 410 Construction Bldg.
 DETROIT, MICH., 605 Stevens Bldg.
 INDIANAPOLIS, IND., 321 Hume-Mansur Bldg.

KANSAS CITY, MO., 609 Interstate Bldg.
 LOS ANGELES, CAL., 448 So. Hill Street
 NEW YORK, N. Y., 650 Graybar Bldg.
 NEWARK, N. J., 1027 Broad Street
 OAKLAND, CAL., 63rd and Doyle Streets
 PHILADELPHIA, PA., 402 Guarantee Trust Bldg.
 PITTSBURGH, PA., 1011 Empire Bldg.
 SAN FRANCISCO, CAL., 526-28 Hunter-Dulin Bldg.
 SEATTLE, WASH., 1411 4th Avenue Bldg.
 WASHINGTON, D. C., 715 Barr Bldg.

Fenestra
HOLORIB
 ROOF DECKS FLOOR FORMS



Above—Welding deck to purlin
 Below—The completed welds



Workmen laying 97,000 sq. ft. of Holorib Roof Deck by the welding process at the plant of Babcock & Wilcox Tube Co., Beaver Falls, Pa.

TYPICAL HOLORIB INSTALLATIONS

Building	Location	Squares	Building	Location	Squares
Illinois Bell Telephone Co.	Chicago, Ill.	270	Packard Motor Co.	Detroit, Mich.	382
Kingston High School	Kingston, Pa.	501	Dr. Phillips Packing Co.	Orlando, Fla.	317
New Mexico State University	Albuquerque, N. M.	370	Columbus Auditorium	Columbus, O.	365
Freihofer Theatre	Upper Darby (Phila.) Pa.	332	Oliver Farm Equipment Co.	Des Moines, Ia.	3180
Columbus Railway, Power & Light Co.	Columbus, O.	320	Celotex Company	Marrero, La.	843
White Company	Syracuse, N. Y.	390	U. S. Navy Hangars	Coco Sola, C. Z.	955
Rockford Drop Forge Co.	Rockford, Ill.	200	General Electric Co.	Peterboro, Ont.	970
			Canadian Potteries Ltd.	St. Johns, N. B.	1397
			New York Power & Light Co.	Albany, N. Y.	970

PRODUCT

Holorib Reinforced Steel Roof Plates which form the rigid and permanent base of a completely insulated and waterproofed unit.

Holorib Deck Plates are fabricated from copper-bearing or galvanized steel sheets reinforced by self-contained triangular ribs rolled into the sheet longitudinally, which are anchored or welded to the purlins by specially formed anchor clips. The sheets dovetail and interlock securely together both on sides and ends, forming a deck through which there is no asphalt dripage.

Narrow span 24 gauge Holorib sheets are rolled with triangular ribs $\frac{3}{4}$ in. deep spaced $3\frac{1}{4}$ in. on centers. They are specially designed for structural purlins or light joists spaced approximately 4 ft. Wide span Holorib sheets are fabricated from 22, 20 or 18 gauge sheets with triangular ribs $1\frac{1}{2}$ in. deep, and will cover with unusual rigidity purlin spacings as high as 8 ft. 6 in.

All Holorib sheets are dip-coated and oven-baked at the factory with a steel gray finish forming a tough protective film. By this process no metal in the Holorib sheet is left bare.

The angles forming the rib of the Holorib sheet are less acute than in other decks. There is no distortion of the metal.

ADAPTABILITY

Holorib steel deck construction is applicable to flat, pitched, or bowstring truss roofs, and the proper gauge Holorib sheets are fabricated for those purlin spacings which are most economical in the use of structural steel. It is especially adapted to all types of commercial and industrial buildings, including airplane hangars, theatres, and auditoriums.

OUTSTANDING ADVANTAGES

A long-lived roof, requiring a minimum of maintenance.

Its light weight reduces the requirements of the structural steel—(one square foot of Holorib weighs approximately 5 lbs., including insulation and waterproofing).

Carries required loads over wide purlin spacing with ample factors of safety.

Makes a firm, smooth and inherently dry mopping surface for the application of insulation and roofing felts. Stays water-tight years longer because

of the perfect combination of the materials employed. Quickly laid. Speeds the completion of the building.

May be laid in any weather men can work—nothing to pour—nothing to freeze—nothing to dry out.

Unaffected by atmospheric changes. Expansion and contraction are negligible.

Saves winter fuel. Provides cooler interiors in warm weather.

Saves insurance. Takes a fire-proof rating when used over incombustible contents.

Telescoping end laps made over the purlins form tight interlocking joints.

May be welded in place forming a rigid yet self-adjusting foundation for insulation and waterproofing.

Lower in cost than any other type of fire-resistive roof of the same insulating efficiency.

Provides attractive ceilings. It is not a dust collector.

May be used as a highly satisfactory floor with or without concrete.

INSULATION

Holorib Engineers recommend that insulation be applied over their steel roof deck. Our experience indicates most satisfactory results with the pressure-resisting types of insulation full-mopped with hot asphalt. Final waterproofing is accomplished with built-up felts, preferably with a surface finish of slag, gravel, or asbestos. Slate or tile may be successfully applied over Holorib decking. On steep surfaces, Holorib Division will furnish at slight additional cost a new type of self-expanding nail which anchors the insulation to the deck without penetrating the sheet itself. These nails are also of Holorib manufacture.

The insulation applied to Holorib steel deck plates effectively retards the passage of heat in either direction. In this respect the Holorib roof unit with 1 in. of insulation is equal to 24 in. of solid concrete in heat retarding value. This effective insulation reduces fuel consumption and may be taken into account in reducing the amount of radiation and size of the heating plant.

Dry steel will not rust. The insulation applied over Holorib entirely prevents condensation caused by the warm air within the building meeting a surface chilled by a colder exterior temperature. As a result, the Holorib roof deck always remains at approximately room temperature well above the dewpoint of the interior air. Accumulation of

moisture due to a temperature difference is absent.

With the Fenestra Holorib deck protected with paint from below and insulation above, no injurious corroding action is possible.

With high humidities and temperatures, from $1\frac{1}{2}$ to 2 in. of insulation should be applied in broken joint construction. The ceiling should be given at least two field coats of paint.

In the average heated buildings, such as machine shops and garages, schools and auditoriums, a 1-in. thickness of insulating material will return a substantial dividend in fuel saved annually, and will prevent any possibility of condensation.

SPECIFICATIONS

1. The roof deck shall be of copper-bearing steel sheets dip painted and oven baked after fabrication, manufactured by The Holorib Division of the Detroit Steel Products Co., Detroit, Mich., and shall be capable of withstanding a distributed live load of —without permanent deflection on the spans. All end laps shall be not less than $2\frac{1}{2}$ in. in length, made over the purlins, and shall be of the interlocking or telescoping type. The sheets shall be securely fastened every 12 in. on center to the purlins with Holorib clips.

2. The insulation shall be of the pressure resisting type—if more than one thickness, it shall be applied in sheets with broken joint construction.

(a) On roof surfaces having a pitch less than 3 in. in 12 in., the insulation shall be mopped solidly to the Holorib roof deck with hot asphalt having a melting point from 155 to 160° Fahr., a penetration of 10 at 32° Fahr., and a ductility of 25 at 77° Fahr.

(b) On roof surfaces having a pitch 3 in. in 12 in. or more, the hot asphalt shall be mechanically stiffened by the addition of 10 lb. of short asbestos fibre to each 100 lb. of asphalt to avoid slipping or creeping. The insulation shall be fastened with *Holorib expanding nails*.

3. The waterproofing shall be of the built-up bituminous type for flat or pitched roofs. (On steep pitched roofs slate, tile, or asbestos shingles may be installed.)

The built-up roofing shall be first-class in every respect, the surface finish to be slag, gravel, asbestos, or asphalt. [Where a built-up asphalt waterproofing is used, not less than four plies of all rag felt equal to U. S. Government Standard Specification No. 86 should be specified.]

WIDE-SPAN DECK—Where slate, tile, or asbestos shingles are used, the insulation shall be securely fastened to the Holorib deck by using four Holorib expanding nails to each 10 sq. ft. in addition to being cemented with mechanically stiffened asphalt as above described. After the insulation is applied, a 15-lb. saturated felt shall be cemented on in hot asphalt, after which the tile or slate to be applied shall be nailed directly into the waterproofing and insulation.

24-GAUGE HOLORIB—Where slate, tile, or asbestos shingles are used with 24-gauge Holorib, the first ply of insulating material shall be mopped

solidly to the Holorib deck and additionally secured with 1-in. American Felt Roofing nails driven into the openings between the ribs; the second layer of insulating material shall then be mopped to the first and, in addition, shall be securely nailed to the first ply with clinch nails.

4. Saddles to carry water to outlets are to be formed from a material satisfactory for this purpose. *Poured saddles are to be formed over the insulating material* which has been further waterproofed with one ply of felt or one heavy mopping of asphalt. *In no case should gypsum or concrete saddles be built over the bare deck.*

5. One field coat of paint shall be applied to the underside of Holorib immediately after erection. (This work is part of the painting contract.)

ERECTION AND ENGINEERING SERVICE

The Holorib Division of Detroit Steel Products Company produces the steel sheets, fastening clips, and (1) will contract to erect the steel deck with their own field force, or (2) furnish superintendence at a moderate charge so that the deck may be applied by the general contractor, or (3) will co-operate with capable and responsible roofing contractors so that the architect and owner may be relieved of all responsibility for the permanence and stability of the roof unit.

Holorib Steel Deck should be erected after all walls, coping and structural steel are in place.

Clips are designed to fasten properly to varying sizes and types of purlins. With 24 gauge and lighter the riveting type with prongs which pierce both upper and lower sheets is employed. With 22 gauge and heavier either piercing or nonpiercing clips may be used. The fact that the sheets are pierced has no bearing on their permanence as they are sealed in hot asphalt and are under the insulation.

The holding power of all clips is far in excess of possible inside wind pressure. Non-piercing clips are made of spring steel with an individual holding power not less than 175 lbs. Piercing clips will carry heavier loads.

Two clips of either type are used per sheet per purlin, spaced alternately 6 and 12 in. apart.

Where Wide-Span deck plates are specified, single starting ribs are furnished to support the Holorib along the sides of the building. With 24 gauge, as the ribs are only approximately 3 in. apart, these starting ribs are unnecessary.

Under average conditions a crew of four men will erect 2500 sq. ft. of Holorib daily.

Framing

Framing and structural steel are not part of Holorib Steel Deck, unless so specified.

Welding

At slight extra cost Holorib may be electrically welded to the purlins. Because of its telescoping end lap, Holorib roof deck is easily welded from above. Each individual weld has a holding power tested to 500 lbs. pull without failure. The shape of the rib and the method of erection automatically takes care of any contraction or expansion.

Bearings

The ends of Holorib sheets must always be supported. Wall bearings should be either raggie, corbel, or purlin spaced approximately 4 in. from the wall. Plans should show details of these sections.

Vents, Stacks and Sumps

Holorib is readily cut around vents, but if over 8 in. in diameter, angle bracing should be provided by the steel fabricator, as unsupported decking will not carry these loads.

Curbs and Sidewalls

Framing angles both top and bottom should be provided, punched 9 in. on center with $\frac{7}{16}$ -in. holes. Holorib is furnished cut to proper size and is bolted to these angles.

Eaves and Gables

Eave struts should be punched 9 in. on center with $\frac{7}{16}$ -in. holes if overhang (limited to 12 in.) is desired. Overhang at the gable (sides) must be supported with lookouts or purlin extensions.

Closures, Flashing and Edging

Closures, flashing and edging are generally applied after the insulation is in place and are properly a part of the roofing or sheet metal contract (not roof deck) but when the construction of a building is such to require sheet metal to complete the application of the deck proper Detroit Steel Products will furnish this material. Our proposal will be specific as to the material we will furnish.

Paint

Unless otherwise specified, all Holorib plates are manufactured from copper-bearing steel dip coated in a priming coat of battleship gray paint baked on.

On special order we will fabricate aluminum, galvanized, or lead-coated Holorib.

Aluminum Holorib requires no paint as sheets will not corrode except under any extraordinary conditions.

Since a coating of 1 oz. of zinc per sq. ft. is, we believe, no better protection than that afforded by dip-painting, the additional cost of tight coat galvanized deck plates is not altogether justified as the requirement of field painting is not eliminated. To galvanize after fabrication is impractical on account of the additional excessive charges.

We cannot guarantee that lead-coated sheets (Terne-plate) will not contain pinholes.

ENGINEERING DATA

Deflection Tests

The deflections shown are the result of tests made on bare sheets by the Testing Materials Laboratory and by qualified Engineers of the Case School of Applied Science of Cleveland. Tests made after the application of insulation indicate average 15% greater rigidity.

PURLIN SPACINGS

Ga.	Dist. Load Lbs. Per Sq. Ft.	PURLIN SPACINGS									
		4'0"	4'6"	5'0"	5'6"	6'0"	6'6"	7'0"	7'6"	8'0"	8'6"
24	30	.151	.170	...	...	...	...	...	...	...	...
24	40	.190	.247	...	...	...	...	...	...	...	...
24	50	.230	.310	...	...	...	...	...	...	...	...
22	30	...	...	...	.013	.050	...	...	...	...	...
22	40	...	...	.006	.038	.118	...	...	...	...	...
22	50	.010	.062	.145	.200	...	...	...	...	...	...

PURLIN SPACINGS

Ga.	Dist. Load Lbs. Per Sq. Ft.	4'0"	4'6"	5'0"	5'6"	6'0"	6'6"	7'0"	7'6"	8'0"	8'6"
	
20	30	...	...	...	.031	.071	.103	.300	...	...	...
20	40	...	...	...	.014	.106	.162	.237	.450	...	...
20	50	...	...	.008	.025	.143	.201	.290	.550	...	...
18	30	...	...	...	...	...	...	...	.230	.265	.285
18	40	...	...	...	...	...	...	...	.310	.350	.380
18	50	...	...	...	...	...	...	...	.405	.440	.485

All tests were made with standard stock sheets of copper-bearing low carbon content steel sheets.

	24G	22G	20G	18G
Section Modulus*	.0134	.0912	.1050	.1207
Moment of Inertia	.0061	.0820	.0942	.1078

*Based on rib sections with a top flange two and one-half times the width of the base.

Thermal Conductivity of Holorib

The following table gives the thermal conductivity of Holorib roofs, including in each case a standard composition roofing:

1. Holorib without insulation 0.781 B.t.u.
2. Holorib and $\frac{1}{2}$ -in. insulation 0.358 B.t.u.
3. Holorib and 1-in. insulation 0.232 B.t.u.
4. Holorib and $1\frac{1}{2}$ -in. insulation 0.172 B.t.u.
5. Holorib and 2-in. insulation 0.136 B.t.u.
6. 2-in. Plank ($1\frac{3}{4}$ in. net) D. & M. when new and joints tight 0.345 B.t.u.
7. 3-in. Plank ($2\frac{3}{4}$ in. net) D. & M. when new and joints tight 0.256 B.t.u.
8. $2\frac{1}{2}$ -in. Poured Gypsum on plasterboard 0.354 B.t.u.
9. 3-in. Poured Concrete 0.610 B.t.u.
10. $1\frac{1}{8}$ -in. Cement Tile 0.680 B.t.u.

Insulation referred to above may consist of such pressure-resisting materials as cork, Celotex, Insulite, J-M Board, etc. The values of the thermal conductivity are in terms of B.t.u. (British thermal units) per sq. ft. per hour, per degree difference between inside and outside temperature. They are taken from data published by the American Society of Heating and Ventilating Engineers Guide (1930 Edition).

Holorib insulated construction forms almost an air-tight blanket; there are no cracks to permit leakage of heat.

Plank decks dry out and warp, permitting large heat losses.

Uninsulated metal decks have practically no heat stopping value.

Comparative Roof Weights

Holorib:	Lb. per sq. ft.
Waterproof covering	1.5
1-in. insulation	1.5
Steel deck	1.6 to 2.9
Total approximately	5 lb.
2-in. plank	8
3-in. plank	11
3-in. gypsum	18
Precast concrete	18 to 25
3-in. poured concrete	38

Add 3 to 5 lb. per sq. ft. if slag or gravel is used.

SIZES, WEIGHTS, LOADS OF HOLORIB DECKS

Sheet sizes, in.	24 gauge*	4 ft. 3 in. to 10 ft. 3 in. Multiples of 3 in. $16\frac{1}{4}$ -in. covering capacity.
	18, 20, 22 gauge†	5 ft. 3 in. to 10 ft. 3 in. Multiples of 6 in. $18\frac{1}{8}$ -in. covering capacity.

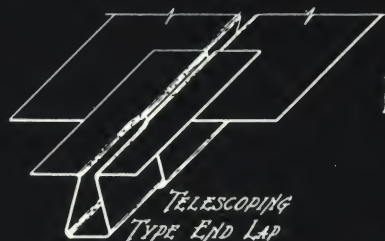
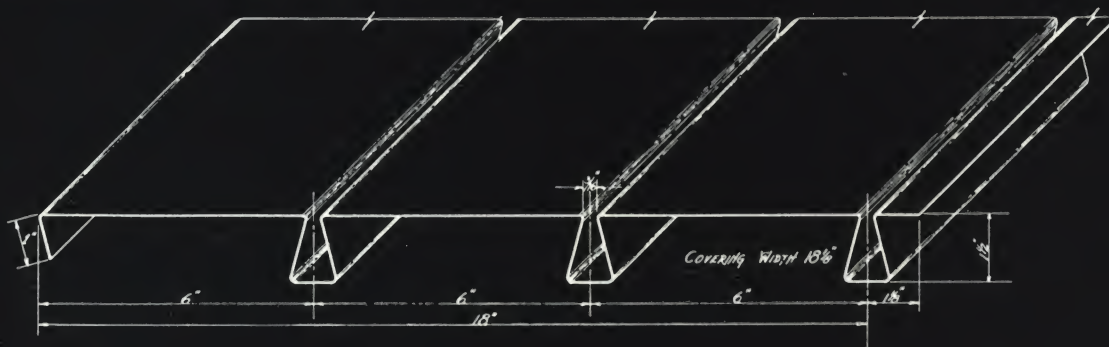
*All laps are made on purlins.

†All telescoping end laps are held within 3 in. of purlins.

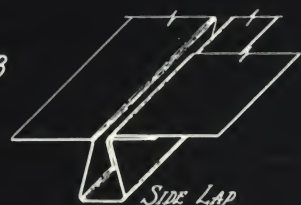
Descriptive Data			Safe Carrying Loads, Holorib Roof Deck		
Gauge	Rib size, in.	Shipping wt. per 100 sq. ft. with clips	Gauge	Type	Purlin Spacing
26*	$\frac{3}{4}$	130 lbs.	26*	Special	2'0"—3'0"
24	$\frac{3}{4}$	170 lbs.	24	Standard	4'0"—4'6"
22	$1\frac{1}{2}$	235 lbs.	22	Wide-span	4'6"—5'0"
20	$1\frac{1}{2}$	285 lbs.	20	Wide-span	5'6"—6'3"
			20	Wide-span	6'6"—7'0"
			20	Wide-span	7'0"—7'6"
			18	Wide-span	7'6"—8'6"
					Safe load lb. per sq. ft.
					45—40
					50—45
					50—45
					45—40
					40—30
					45—35

*Applied inverted for concrete floor forms. Send for complete literature. C. L. 36,000 lb. Classed "Iron & Steel Roofing N. O. I. B. N." 5th C. L., 4th L. C. L.

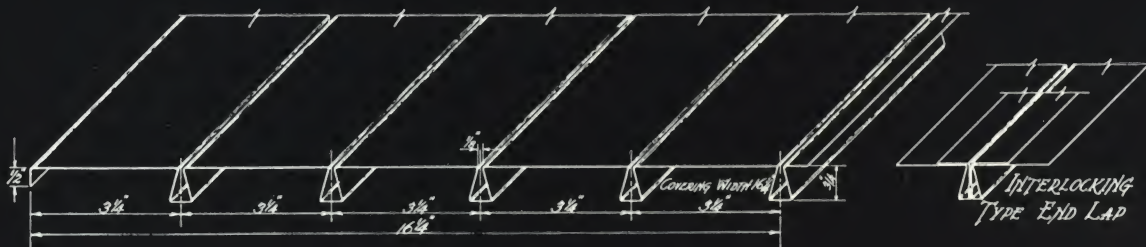
Add 15 lbs. per square to allow for crating on export shipments. Galvanized or aluminum sheets furnished on special order.



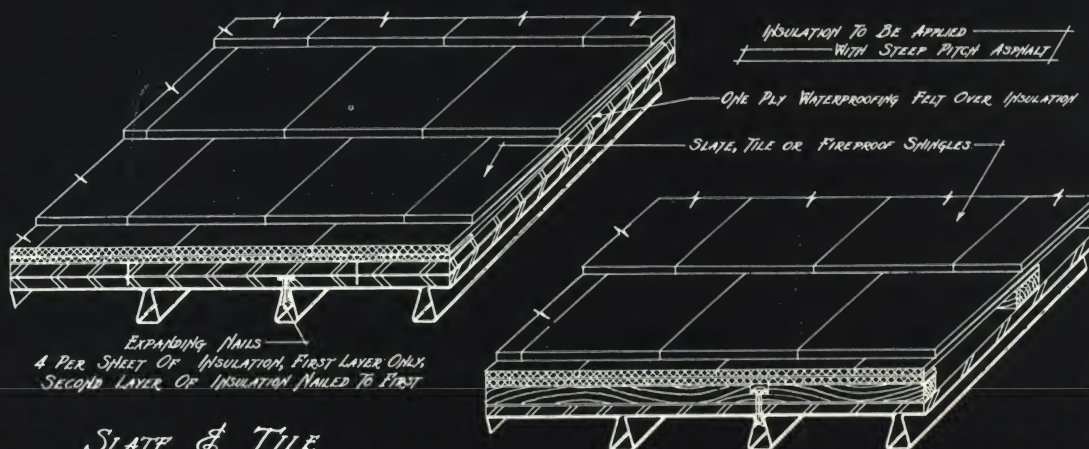
WIDE-SPAN HOLORIB



ALL END LAPS MADE WITH THE FALL OF WATER



NARROW-SPAN HOLORIB

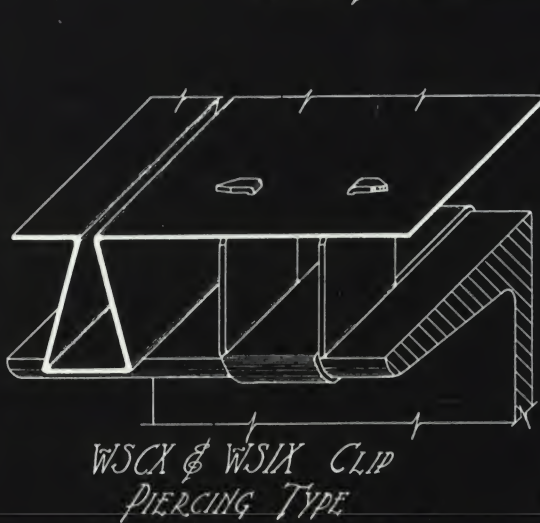
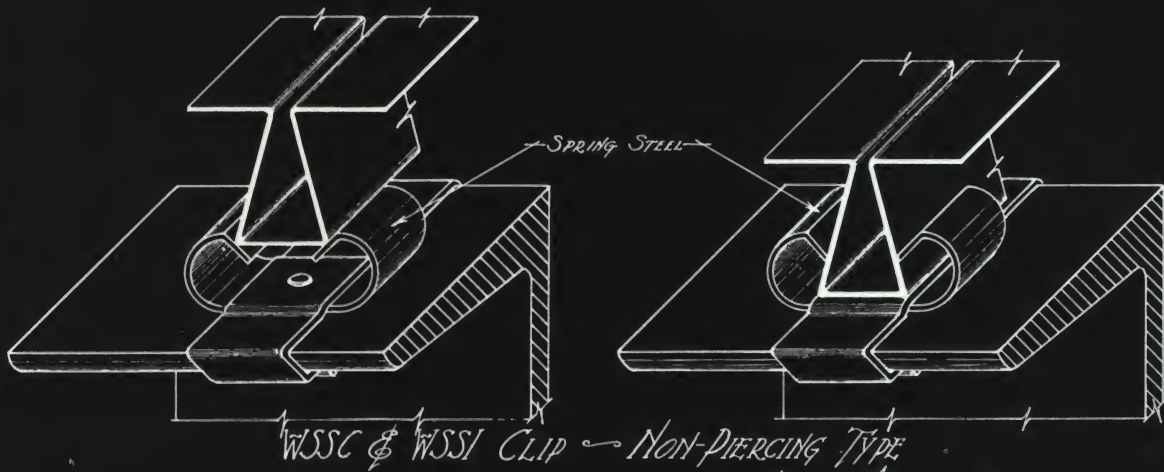
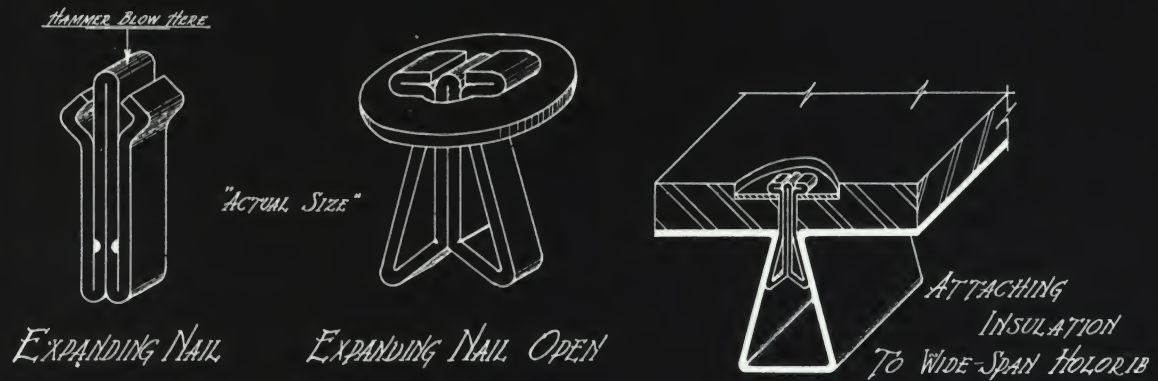


SLATE & TILE
ROOF CONSTRUCTION

Fenestra
HOLORIB
STEEL ROOFING SYSTEM

SHEET DIMENSIONS AND
STEEP PITCH ROOF CONSTRUCTION

Plate No
H-101

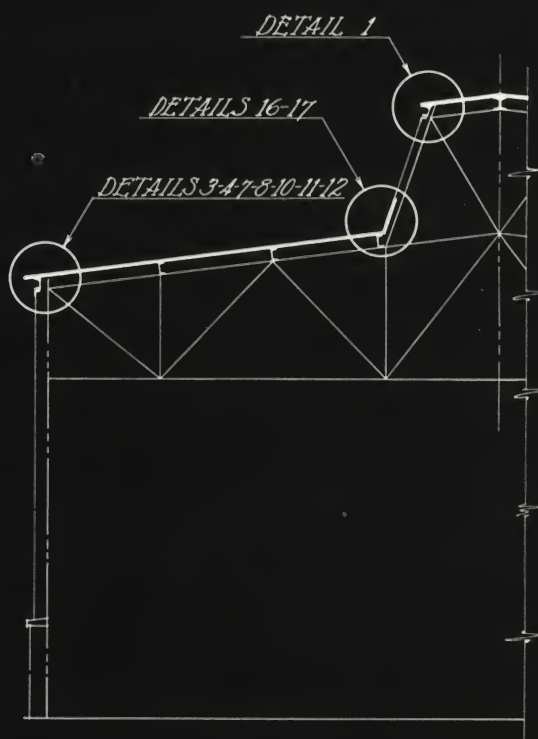
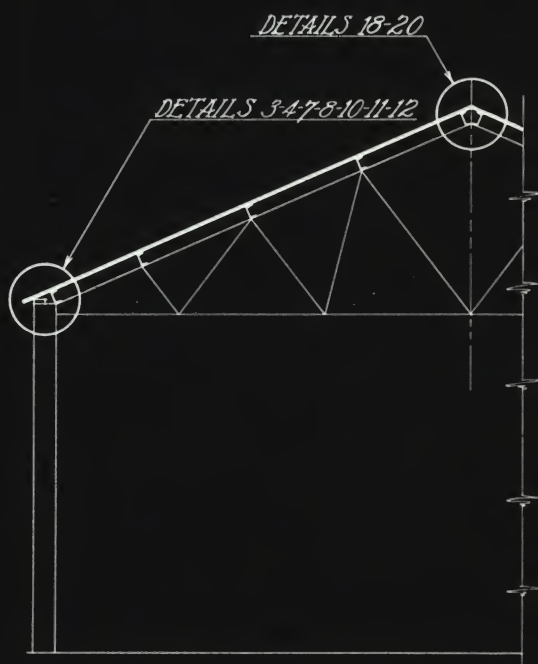
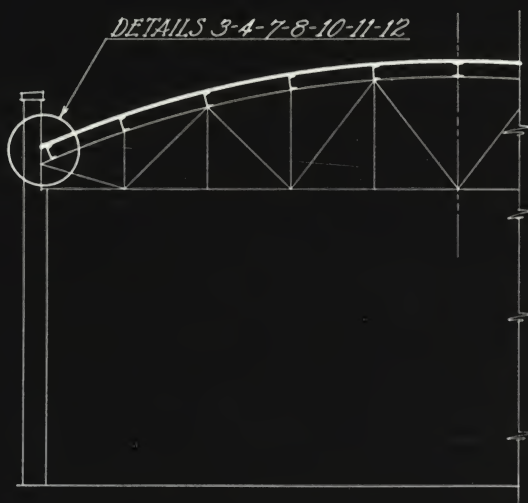
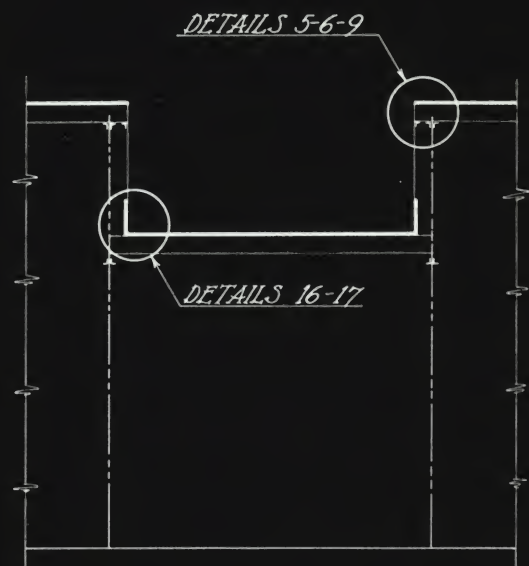


THESE FASTENERS USED ONLY
WITH WIDE-SPAN HOLORIB

Fenestra
HOLORIB
DOES WHAT YOUR MONEY

TYPICAL
HOLORIB FASTENERS

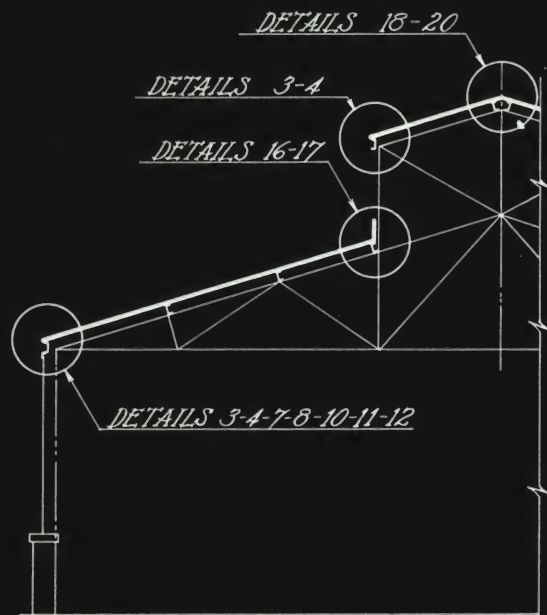
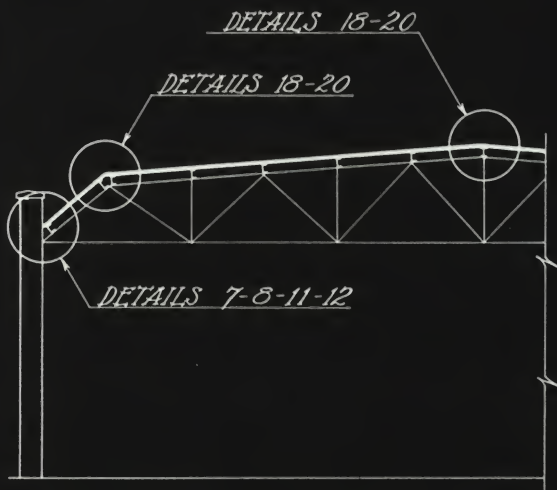
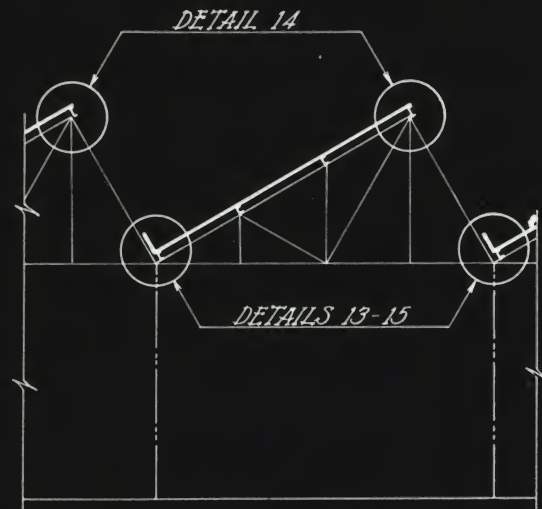
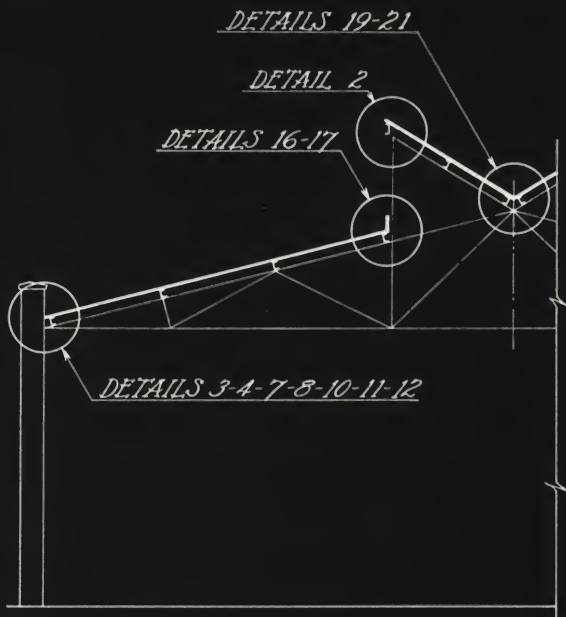
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Fenestra
HOLORIB
ROOF BUILDING SYSTEM

TYPICAL BUILDINGS

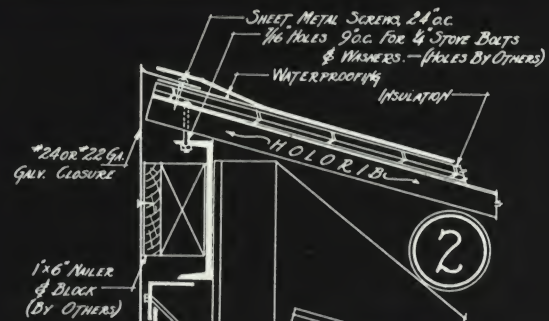
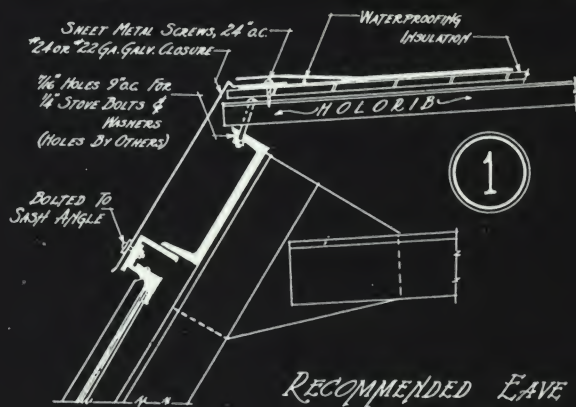
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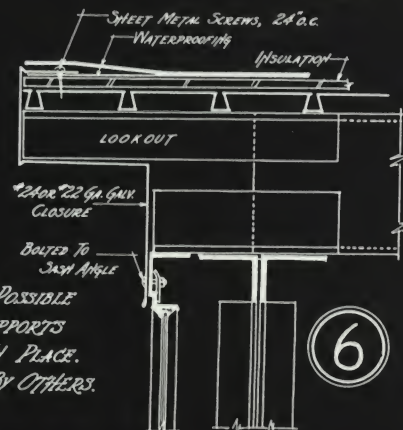
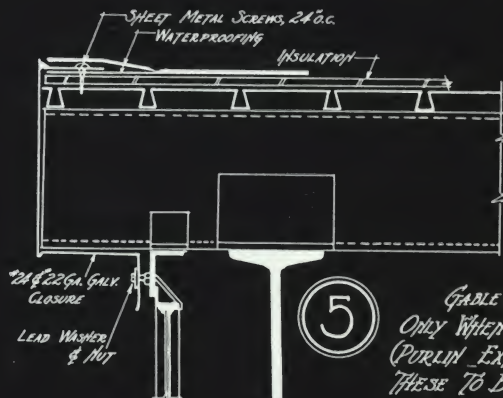
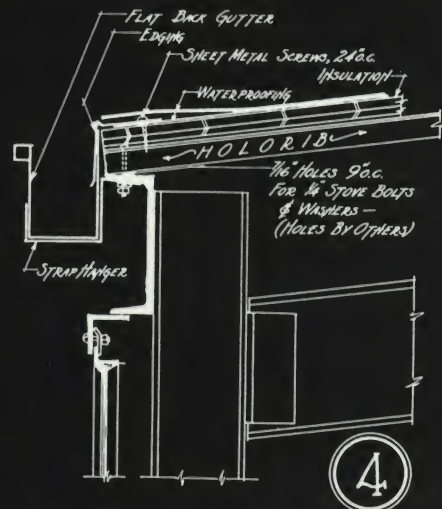
Fenestra
HOLORIB
YOUR HEAVY STEEL ROOF

TYPICAL BUILDINGS

Plate No
H-104



RECOMMENDED EAVE
OVERHANG 9"



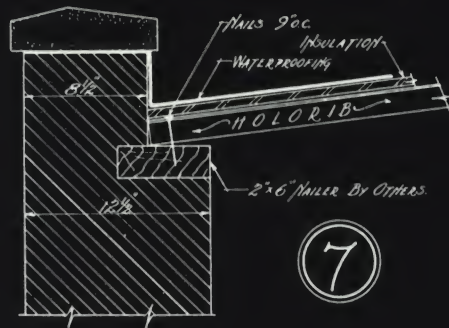
GABLE (SIDE) OVERHANG POSSIBLE
ONLY WHEN SUFFICIENT SUPPORTS
(PURLIN EXTENSIONS) ARE IN PLACE.
THESE TO BE FURNISHED BY OTHERS.

INSULATION & WATERPROOFING BY OTHERS:
UNLESS SO SPECIFIED, CLOSURES ARE NOT A PART OF THE
ROOF DECK PROPER & SHOULD BE FURNISHED BY OTHERS

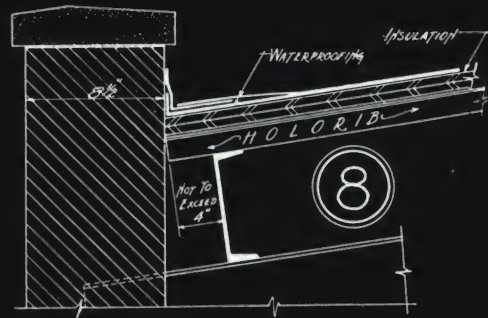
Fenestra
HOLORIB
ROOF DECK CLOSURE SYSTEM

EAVE AND GABLE DETAILS

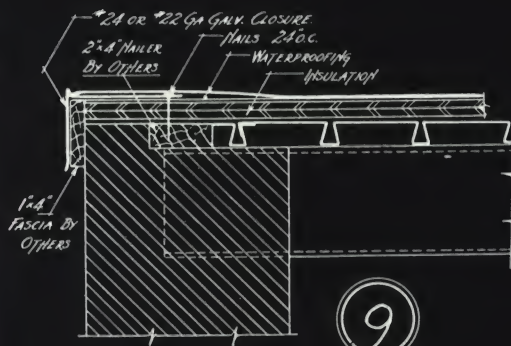
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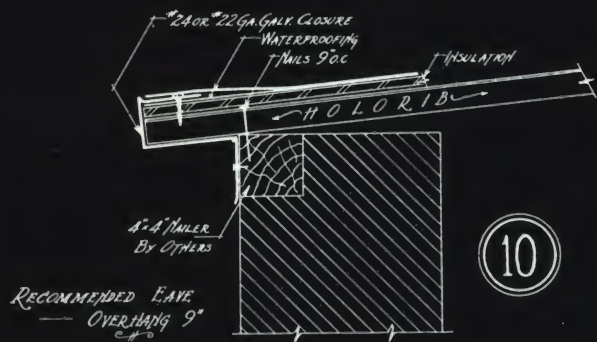
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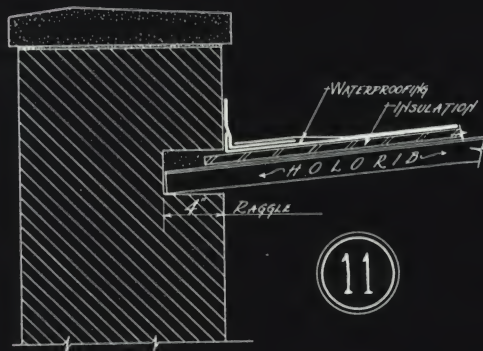
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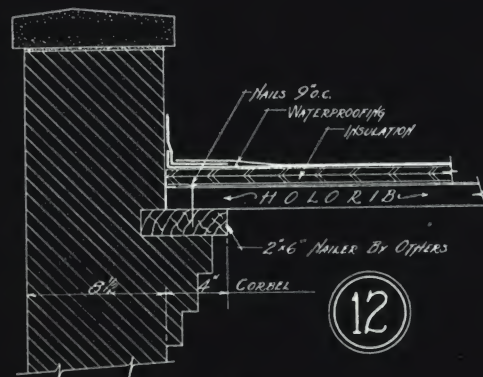
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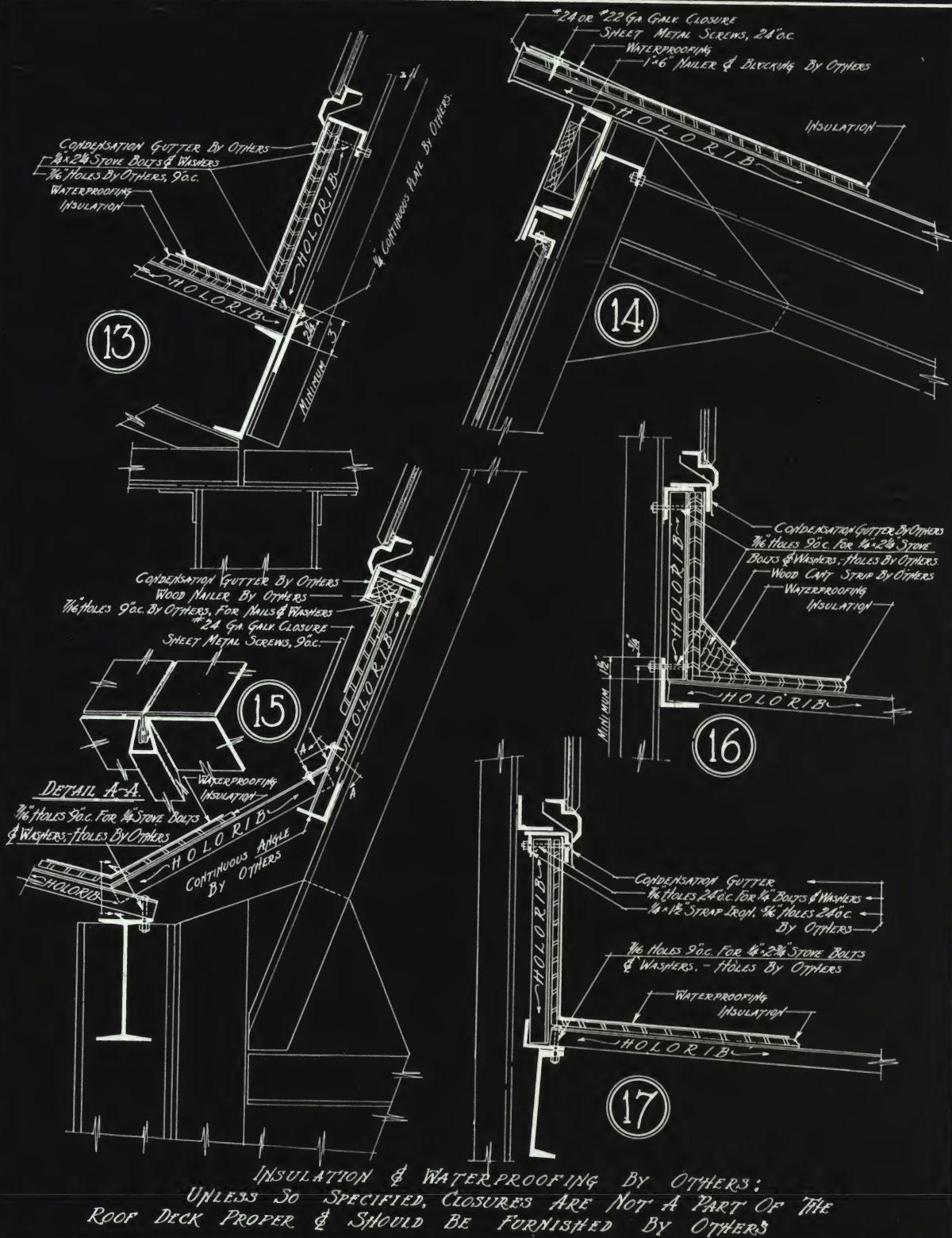
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INSULATION & WATERPROOFING BY OTHERS:
UNLESS SO SPECIFIED, CLOSURES ARE NOT A PART OF THE
ROOF DECK PROPER & SHOULD BE FURNISHED BY OTHERS

Fenestra
HOLORIB
ROOF WALL FLASHING

WALL DETAILS

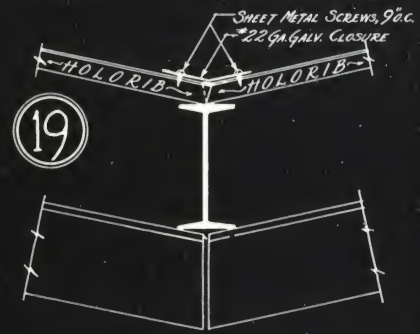
Plate No
H-106



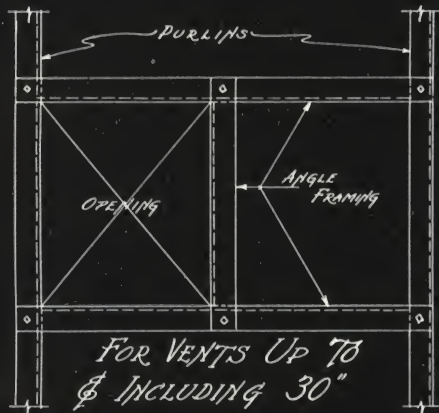
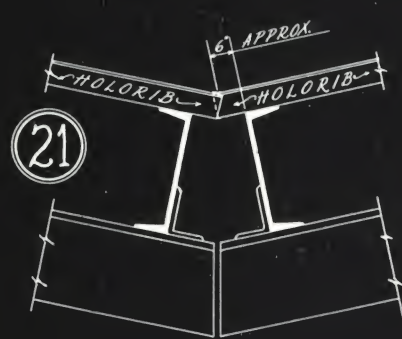
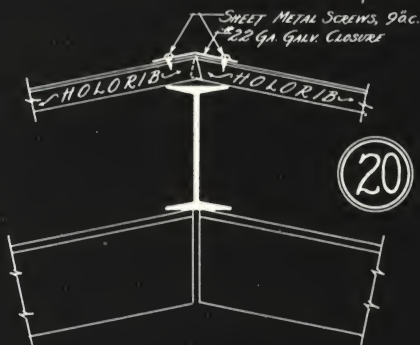
Fenestra
HOLORIB
STEEL ROOFING & CLADDING

SAWTOOTH AND CURB DETAILS

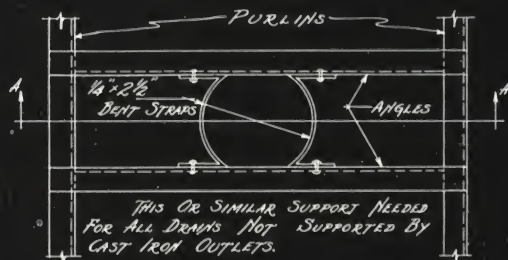
Plate No
H-107



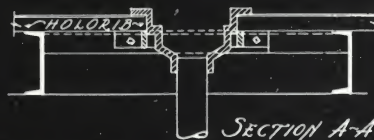
WHEN REQUIRED, THE CLOSURES SHOWN HERE WILL BE FURNISHED AT A SLIGHT ADDITIONAL COST.



NOTE
ALL SUPPORTS
TO BE FURNISHED
BY OTHERS.



THIS OR SIMILAR SUPPORT NEEDED
FOR ALL DRAINS NOT SUPPORTED BY
CAST IRON OUTLETS.



DRAIN SUPPORTS

Fenestra
HOLORIB
STEEL ROOF DECK FLOOR FORM

RIDGE, HIP & VALLEY DETAILS
SUGGESTED FRAMING FOR OPENINGS

Plate No
H-108

Fenestra

HOLORIB

STEEL ROOF DECKS

Detroit Steel
2250 E. G
Detroit

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Fenestra

HOLORIB

STEEL ROOF DECKS

Detroit Steel Products Company
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